REMARKS

By this Amendment, claims 10-11 are cancelled, and claim 8 is amended. Claims 9 and 12-15 remain in the application. Thus, claims 8-9 and 12-15 are active in the application. Reexamination and reconsideration of the application are respectfully requested.

In item 3 on page 2 of the Office Action, claims 8-15 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Fumiyasu et al. (JP 07162990) in view of Olsson (U.S. 5,913,178). This rejection is respectfully traversed for the following reasons.

The present invention provides a speaker apparatus comprising an amplifier which is operable to receive an input signal and to output an amplified signal, a speaker unit which is operable to reproduce the amplified signal and to radiate an acoustic output signal, and an acoustic pipe mounted in the front of the speaker unit. The speaker apparatus of the present invention also comprises a microphone disposed in the acoustic pipe, where the microphone is operable to detect the acoustic output signal radiated from the speaker unit, and a feedback circuit which is operable to feed the acoustic output signal detected by the microphone back to an input side of the amplifier.

Since the acoustic output signal is detected by the microphone disposed in the acoustic pipe, the microphone is susceptible to resonance caused by standing waves occurring in the acoustic pipe or by standing waves due to the length of the acoustic pipe. If the microphone detects such resonance generated in the acoustic pipe, the microphone will resultantly feed such resonance back to the amplifier.

Conventional speaker apparatuses have been developed where sound absorbing material are disposed on the inner walls of the acoustic pipe and where the microphone is located in front of and close to the speaker unit, but even with such a construction, the microphone still detects acoustic outputs of a second and/or higher resonance generated in the acoustic pipe and a resonance generated in a closed space of the acoustic pipe which is orthogonal to the longitudinal direction of the acoustic pipe. Thus, such resonance detected by the microphone is fed back to the amplifier and is resultantly output by the speaker unit. Furthermore, the cost of the speaker apparatus increases by disposing sound absorbing material on the inner walls of the acoustic pipe even though

the incorporation of the sound absorbing material does not prevent the microphone from detecting the second and/or higher resonance and the resonance generated in the closed space of the acoustic pipe that is orthogonal to the longitudinal direction of the acoustic pipe.

It is therefore an object of the present invention to provide an improved speaker apparatus in which the microphone does not detect a second and/or higher resonance generated in the acoustic pipe and a resonance generated in a closed space of the acoustic pipe which is orthogonal to the longitudinal direction of the acoustic pipe. The present invention, as recited in claim 8 and as described in lines 6-16 on page 10 of the preliminarily amended original specification and in lines 9-21 on page 8 of the substitute specification, achieves this object by placing the microphone in a position where sound pressure of a resonance occurring in a longitudinal direction, in a latitudinal direction (fb) orthogonal to the longitudinal direction, and in a direction (fc) orthogonal to both the longitudinal direction and the latitudinal direction of the acoustic pipe is low enough so as not to cause oscillation. By the placing the microphone in the desired location, the present invention obviates the need for sound absorbing material, i.e., attenuating material.

Claim 8 has been amended to recite the limitations originally recited in cancelled claim 10. Accordingly, claim 8 recites that the microphone is placed at a position where sound pressure of at least one of a second and third pipe resonance in the longitudinal direction, in the latitudinal direction and in the direction orthogonal to both the longitudinal direction and the latitudinal direction of the acoustic pipe is low enough so as not to cause oscillation, and where at least sound pressure of a resonance occurring in a closed space of the acoustic pipe is low enough so as not to cause oscillation.

On page 3 of the Office Action, the Examiner alleged that Fumiyasu et al., with reference to Figures 4 and 7, discloses that "the sound pressure of at least [one] of the second and third pipe resonance is low enough so as not cause oscillation." The Applicant respectfully submits that this interpretation of Fumiyasu et al. is unfounded in view of the actual disclosure of Fumiyasu et al.

In fact, the Applicant notes that, on page 2 of the October 3, 2003 Office Action, the Examiner acknowledged that Fumiyasu et al. does not disclose or suggest placing the

microphone at a position where sound pressure of at least one of a second and higher pipe resonance of the acoustic pipe is low enough so as not to cause oscillation and/or at a position where sound pressure of resonance occurring in a closed space of the acoustic pipe is low enough so as not cause oscillation.

As described above, claim 8 recites that the microphone is placed at a position where sound pressure of at least one of a second and third pipe resonance in the longitudinal direction, in the latitudinal direction and in the direction orthogonal to both the longitudinal direction and the latitudinal direction of the acoustic pipe is low enough so as not to cause oscillation, and where at least sound pressure of a resonance occurring in a closed space of the acoustic pipe is low enough so as not to cause oscillation. Accordingly, the present invention, as recited in claim 8, specifically defines the placement of the microphone in a three dimensional direction of the acoustic pipe.

In contrast to the present invention, Fumiyasu et al. does not contemplate anything about the "second and third pipe resonance." Only the Applicant of the present application has discovered the importance of the "second and third pipe resonance" with regard to the feedback system of the speaker apparatus. Fumiyasu et al. merely discloses that the output signal is connected to a load input terminal of the subtractor 8 so as to improve the stability of the feedback circuit and make an acoustic signal with rapid phase change stable and increase the feedback amount.

Accordingly, despite the Examiner's assertion to the contrary, Fumiyasu et al. clearly does not disclose, suggest or even contemplate the microphone is placed at a position where sound pressure of at least one of a second and third pipe resonance in the longitudinal direction, in the latitudinal direction and in the direction orthogonal to both the longitudinal direction and the latitudinal direction of the acoustic pipe is low enough so as not to cause oscillation, and where at least sound pressure of a resonance occurring in a closed space of the acoustic pipe is low enough so as not to cause oscillation, as recited in claim 8.

As described above, claim 8 specifically defines the placement of the microphone in a three dimensional direction of the acoustic pipe.

On page 3 of the Office Action, the Examiner alleged that "Olsson teaches minimizing at [least] one of a second and third pipe resonance." The Examiner, however, did not provide support for this assertion.

Olsson merely discloses that, in order to reduce resonant frequencies, the placement of the microphone is 2/3 of the total length of the sound guide (quarter-wave pipe) 5 (see Column 2, lines 32-38, Column 4, lines 19-23 and 50 and Fig. 2b). Olsson also specifically defines the placement of the microphone in the sound guide two-dimensionally (see Column 5, lines 15-19 and Fig. 2b). The placement of the microphone is defined by a + b = 2c, where a is the linear distance from the opening of the cover 3 to the bend of the sound guide 5 disposed in the cover 3, b is the linear distance from the bend of the sound guide 5 to the middle of the microphone 6, and c is the distance from the middle of the microphone 6 to the outer wall of the sound guide 5 (see Column 5, lines 15-19 and Fig. 2b).

Furthermore, as described above, the placement of the microphone as recited in claim 8 obviates the need for sound absorbing material on the inner surface of the acoustic pipe. However, Olsson requires precise placement of attenuating material to remove resonance peaks, because Olsson clearly does not placing the microphone at a position where sound pressure of at least one of a second and third pipe resonance in the longitudinal direction, in the latitudinal direction and in the direction orthogonal to both the longitudinal direction and the latitudinal direction of the acoustic pipe is low enough so as not to cause oscillation, and where at least sound pressure of a resonance occurring in a closed space of the acoustic pipe is low enough so as not to cause oscillation, as recited in claim 8.

Accordingly, similar to Fumiyasu et al., Olsson clearly does not disclose or suggest each and every limitation of claim 8. Therefore, no obvious combination of Fumiyasu et al. and Olsson would result in the invention of claim 8 since Fumiyasu et al. and Olsson, either individually or in combination, clearly fail to disclose or suggest each and every limitation of claim 8.

Therefore, for at least the foregoing reasons, claim 8 is clearly patentable over Fumiyasu et al. and Olsson.

Furthermore, it is submitted that the clear distinctions discussed above are such that a person having ordinary skill in the art at the time the invention was made would not have been motivated to modify Fumiyasu et al. and Olsson in such as manner as to result in, or otherwise render obvious, the present invention as recited in claim 8. Therefore, it is submitted that the claim 8, as well as claims 9 and 12-15 which depend therefrom, are clearly allowable over the prior art as applied by the Examiner.

In view of the foregoing amendments and remarks, it is respectfully submitted that the present application is clearly in condition for allowance. An early notice thereof is respectfully solicited.

If, after reviewing this Amendment, the Examiner feels there are any issues remaining which must be resolved before the application can be passed to issue, the Examiner is respectfully requested to contact the undersigned by telephone in order to resolve such issues.

Respectfully submitted,

Hidekazu TANAKA

By: Jonathan R. Bowser

Jonathan R. Bowser
Registration No. 54,574
Attorney for Applicant

JRB/nrj
Washington, D.C. 20006-1021
Telephone (202) 721-8200
Facsimile (202) 721-8250
August 31, 2005